



Image treatment of synchrotron topographs

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IMAGE TREATMENT OF SYNCHROTRON
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The development of synchrotron facilities means that the processing and analysis of images recorded either on films or by means of TV cameras must be enhanced to extract the maximum number of features from a single image. The experiments are too costly and the time of experience too short to lose part of a possible information. Different mathematical treatments may be used for the same image if one wants to study different features.

In preliminary experiments for the ESRF, conducted at LURE/DCI, we have recorded digitized images directly from a X-Ray camera or later from films using an ordinary video camera. We have studied the influence of the digitization process on the quality of the images and we have investigated various techniques of image treatment such as Fourier filtering or maximum entropy. Wavelets are under investigation.

We will discuss these techniques, showing their possibilities and limitations. For instance we will show how it is possible to correct a varying background which often exists in the topographs, due to extended strains, and which severely prevents from observing small defects in the black areas of the image or enhance the visibility of an anisotropic feature. It is also possible to study an anisotropic texture in the images. Fourier and entropy techniques are complementary. We will compare their results and try to build a strategy for image analysis.

Two kinds of treatments may be considered. On-line analysis for standard features such as background correction, off-line treatment to extract special features. The scientist, having the knowledge of the contents of a topograph, is the only person able to choose between the various means of analysis. Thus a full investigation of a given topograph is a long process which must be applied to selected images only after a first rapid analysis.